

- (b) sensor circuitry that detects one or more of transient, arc, and ground faults;
- (c) counting circuitry that counts the number of transient and arc fault detected; and
- 5 (d) triggering circuitry that triggers the control circuitry to isolate the power supply after a predetermined number of faults are detected.
2. The circuit breaker circuitry according to claim 1 further comprising time delay circuitry that shields the sensor circuitry from current spikes generated when the power supply is connecting to its load.
- 10 3. The circuit breaker circuitry according to claim 1, wherein the counting circuitry signals the triggering circuitry to trigger the control circuitry to isolate the power supply when the number of counted transient and arc faults exceeds the predetermined preset number during a preset time period.
- 
- 15 4. The circuit breaker circuit according to claim 3, wherein the control circuitry comprises a control relay.
5. The circuit breaker circuitry according to claim 4, wherein the control relay comprises of resistive contacts.
- 20 6. The circuit breaker circuitry according to claim 5, wherein the resistive contacts have low electrical resistance.
- 25 7. The circuit breaker circuit according to claim 6, wherein the control circuitry further comprises a circuit breaker connected to the control relay.
8. The circuit breaker circuitry according to claim 7, wherein the sensor circuitry comprises an optocoupler emitting diode.
- 30 9. The circuit breaker circuitry according to claim 8, wherein the sensor circuitry further comprises an optocoupler detecting diode that detects electromagnetic waves emitted from the optocoupler emitting diode.
- 35

5

10

15

20

25

30

35

10. The circuit breaker circuitry according to claim 9, wherein the sensor circuitry further comprises an AND gate that receives signal from the optocoupler detecting diode as one of its inputs.
11. The circuit breaker circuitry according to claim 10, wherein the counting circuitry comprises a counter that receives signal from the sensor circuitry.
12. The circuit breaker circuitry according to claim 11, wherein the counting circuitry further comprises a reset timer that periodically resets the counter.
13. The circuit breaker circuitry according to claim 12, wherein the triggering circuitry comprises a trigger relay that is connected to the counting circuitry.
14. The circuit breaker circuitry according to claim 13, wherein the trigger relay is connected to the circuit breaker.
15. The circuit breaker circuitry according to claim 14, wherein optocoupler emitting diode is activated by a potential drop across the control relay caused by current drawn by one or more of transient, arc, or ground faults.
16. The circuit breaker circuitry according to claim 14, wherein optocoupler emitting diode is activated by a potential drop across the resistive contacts of the control relay caused by current drawn across the resistive contacts by one or more of transient, arc, or ground faults.
17. The circuit breaker circuitry according to claim 15, wherein the counter increases its count by one when the AND gate outputs a non-zero signal.
18. The circuit breaker circuitry according to claim 15, wherein the counter increases its count by one when the AND gate outputs a square wave signal.

19. The circuit breaker circuitry according to claim 17, wherein the counter outputs a high signal when the count exceeds a predetermined number.
- 5 20. The circuit breaker circuitry according to claim 19, wherein the trigger relay overloads the circuit breaker when the counter outputs a high signal to the trigger relay.
- 10 21. The circuit breaker circuitry according to claim 20, wherein the time delay circuitry is connected in series with the sensor circuitry and connected in parallel to the control circuitry.
22. The circuit breaker circuitry according to claim 2, wherein the time delay circuitry comprises a time delay relay.
- 15 23. The circuit breaker circuitry according to claim 22, wherein the time delay circuitry further comprises a fault protection indicator diode.
24. The circuit breaker circuitry according to claim 1, wherein the circuit breaker circuitry operates substantially independently of the load.
- 20 25. The circuit breaker circuitry according to claim 1, wherein the circuit breaker circuitry may be used in one or more of a helicopter, an airplane, and other power distribution systems.
- 25 26. A method for isolating a power supply from one or more of transient, arc, and ground faults comprising the steps of:  
detecting one or more of transient, arc, and ground faults;  
counting the number of transient, arc, and ground faults; and  
disconnecting the power supply from the load when more than a preset number of transient and arc faults are detected.
- 30 27. The method according to claim 26 further comprising the step of delaying detection of transient, arc, and ground faults when power supply is connecting to its load to avoid false detection resulting from current spikes generated by the power supply .
- 35 28. The method according to claim 26, wherein the step of detecting comprises detecting a potential drop due to current drawn by one or more of a transient, arc, or ground fault.

5

29. The method according to claim 26, wherein the step of detecting comprises detecting a potential drop across resistive contacts of control relay caused by current drawn by one or more of a transient, arc, or ground fault across the resistive contacts.

10

30. The method according to claim 28, wherein the step of detecting is performed by an optocoupler emitting diode.

31. The method according to claim 26, wherein the step of counting is performed by a counter.

15

32. The method according to claim 26, wherein the step of delaying detection is performed by a time delay circuitry.

20

33. The method according to claim 26, wherein the method for isolating power supply from arc faults operates substantially independently of the load.

25

30

35